

SEQUENCE LISTING

<110> NISHIMURA, Asuka  
MATSUOKA, Makoto  
ASHIKARI, Motoyoki

<120> GENES THAT CONFER REGENERATION ABILITY  
TO PLANTS, AND USES THEREOF (AS AMENDED)

<130> SHZ-028US

<150> US 60/491837  
<151> 2003-07-31

<150> PCT/JP2004/011307  
<151> 2004-07-30

<160> 6

<170> PatentIn version 3.1

<210> 1  
<211> 12161  
<212> DNA  
<213> Oryza sativa

<220>  
<221> exon  
<222> (6010)..(6418)  
<223>

<220>  
<221> exon  
<222> (10247)..(10601)  
<223>

<220>  
<221> exon  
<222> (10703)..(10991)  
<223>

<220>  
<221> exon  
<222> (11076)..(11813)  
<223>

<220>  
<221> misc\_feature  
<222> (4429)..(4429)  
<223> "n"=a, t, g or c.

<220>  
<221> misc\_feature  
<222> (4479)..(4479)  
<223> "n"=a, t, g or c.

<220>  
<221> misc\_feature  
<222> (4520)..(4520)  
<223> "n"=a, t, g or c.

```
<220>
<221> misc_feature
<222> (4555)..(4555)
<223> "n"=a, t, g or c.

<220>
<221> misc_feature
<222> (4561)..(4561)
<223> "n"=a, t, g or c.

<220>
<221> misc_feature
<222> (4563)..(4563)
<223> "n"=a, t, g or c.

<220>
<221> misc_feature
<222> (4577)..(4578)
<223> "n"=a, t, g or c.

<220>
<221> misc_feature
<222> (4823)..(4823)
<223> "n"=a, t, g or c.

<220>
<221> misc_feature
<222> (7186)..(7186)
<223> "n"=a, t, g or c.

<220>
<221> misc_feature
<222> (11994)..(11994)
<223> "n"=a, t, g or c.

<400> 1
ctcgagcttt tttgactgcc ctaatcaggc gggttccttg tgggaccac ataatgcttt
60

ttttaatcgc cttcacgggc tgcattgcaaa ctatacggca tgggacttcc actactagaa
120

aaaacgggag gtcgaaacac gttttcgcag gcaggcaaac cttccacatg tatcttaacg
180

accgtaaaaa tctccaattt tcacaggtgg accacagcac cgttttcgca ggctacattt
240

cgaatcttcc tgggtgctac agtaaaccac ctgcaaaaat actcacggcg ccaaaaaaaaa
300

tttcggccag ccccgcccc tccctattca aatcacaaat cacaaattct cacaaatctc
360

atccaaaaac aaaatccaat ccaaaaatcc atacatcaac acaaagcatt ggattcaaat
420

ccacaacatc aatttacaag ttaacatcaa tcaacatgta agcttttaaaa cgaaacgtcg
480
```

tcgtcgccgg caaactcctt tgcattgagg ggcgtgccc cccccctccc cctctgtccg  
540

gatttgggag ggagggaggg aggtgtttgc cgccaccacc gccctcccct ctctctgtag  
600

ggccggatct cgggagggag gagaggggag ccgcctccgc acagccatca acgtccgtgc  
660

cgccgtcgcc tcgttcgcac caccgccgtt gcttcccctc ctccggccag atctaggagc  
720

ggggaggaag agagggggag ccaccgccac cgtcgcccc tcgctgccgc gccgtcgtca  
780

cgctccacgc cgccgcgtcc gtgcgcgcgc tgctgcctcc cctcctctgg cgaggaggga  
840

gagagaggga gccgtcgccg cgccgtcgct cccctccttc ggcgaggagg gagagagggg  
900

gaggggaagag ggatggaggg gaggagagtg gcgctgagag agagagagag agacgctgag  
960

gagaggaaat gagtgggtgg gaggggtgga ggagaagata aggaggactt agattttttt  
1020

ttgggtaggt atgatttttg caggcggacc acataagggt ccgcctgcga aaatcaattt  
1080

tttcacgcag accacttaag aggtccgcac gcgaaaataa aggtattttt ttaggcagac  
1140

ctcttaagtg gtccgcctgg aaaaattgat tttcacaagc agatgacgaa aattcacccc  
1200

ggtttatatt ttcgaagatg cttcatcgac gacatcgacc gcgtcctcta tgacggcaac  
1260

gaccgcgtca ccgacaacgg catcgatcac gtcactacg atgacaacga ctgcatcaac  
1320

tccgcatcac tattgtgatg actgttacat ggcgtagaag aaccaaccaa agtgggtggc  
1380

tcacgcgcaa cgacgtctc tgacatatgc aagacgtccc caatggcatc ctgagacatc  
1440

tacaagggtc aagatgctaa caattacagt ttttgtcttc aactgtggc ataaatattt  
1500

tttttcgcct tcggctatat tcggctacac ctacaaccac gggtactaca tgatcggtc  
1560

catcaacgaa catctataac aacaatcatt gacggaaact ccagtcaaga gcgtctgtgt  
1620

catcgctatc ttccatgaca ctcccgtat gactacgtga gggaatagag gagagtcaag  
1680

ggacgacacg gaaggagacg taggcaccag gtggaggacc gtccatcaaa gatgcaattg  
1740

atgatggtga gttgaagaag atgaagaaat aaaagatttc aaatccagtc gcaatcgttc  
1800

gcttcgctcc cgttacgact gagggggaat gttagaagca tagatatatt aattggagat  
1860

aagagtcata caaatataga gataagatat catcctagag atagaattct atagataaaa  
1920

tagagtccta gagataaatc tactcttact tgtacccta tatatacccc atgagaggat  
1980

caatgcaata caccgagaat acaacaatta gattttttta cagttgtaac tatgatacgt  
2040

tgtaatatgc tggatcgggg aagagcgccc gtaatcagtg cccagagat gtaggtctcg  
2100

gctgaactcc attatcaaatt accgtacctc ggtgtgtgca tcatgtttga atcttctatg  
2160

acgtttcttt tgcattcgggt tttcgatgtg acttcagggc tggttttata ataattgatta  
2220

tagtgctgtg acggcaatcg gttgtgagaa ttagctattc gggccccctcc atgtgatttt  
2280

cttgtgattg ggatgtatgg taatgctagg gttttaagggt gtaggattgg tgcattgagag  
2340

atcatcaatt cacttgatg accttctctc cttttatatt tttttatcat tctctccttt  
2400

tttttataat gctactgaac tagtggaata caggggacta atgcaaaaata aaagaaaagt  
2460

atcactgggc acggcataca atttagaaaag tgtgtgattt aggcattagag ctgaccacga  
2520

ccctttacga cttggtcgct cggtttggtta gacgatagat caaccaacaa aagctacgat  
2580

acatgatgta cgtgtcagga tacaaatcct tacaaataac aacagttatt gttcgataac  
2640

ttttatcagt tgtctaggct taccaatgta taatagaaga tgaaaattcc atattactgg  
2700

tatcgatcaa tgctagtaac tctttgagct ttgtctaggt taaaaaaaaat tatggatcca  
2760

ccatcacaaa aatgaaaaac accgggggaaa acaaaaaaac atttaataac agcacaagac  
2820

aaaatgatgt taccgtctac ccgagctcct actccgtacc agcacaacca aacgaacagt  
2880

acccgccggg tcagggggcac gttcgtaaatt ttccctcccg tggctggctg gctgccatct  
2940

ctctcagcca ggggttggtta tttcggccgt ttcgggtgggt cccgatagta aatgagctcc  
3000

agtcaaaacg ccctctgcct cccctcattg cgccacacgc acaccgcac tagatccaga  
3060

tcgaaaaaat cgccatctcg ccgagtcgcc agtcgccgcc tcaacgccgg tcgccgtacc  
3120

gccggcgctg cacgcccccc tccaagccgt cgccccatcg cccccagccg cccggtgggtg  
3180

gggcagcgga tgccgagctt ggcgaggttg ccgaggacga accaggcgag gaggacgagg  
3240

atcttgctga cgagccagag cgggagccac gccatgagca acacggcgag ctgcaacgtg  
3300

gacttgccga gcacctcgcc agggaggacg tggacggcgt cgcgcaccac catcgccggg  
3360

agggcgctgt ggtcgcagag gtcgagcgac accaccatgc cggagttgcc gcacccgacg  
3420

acgagcacct tcttgcccg cgacgcctcg ccggacttgt agaccgcgac atgcatcacc  
3480

tcgctgctat atttggtctt ggactgtgga gacttgctgt cagtgggtgt gttcagaatt  
3540

gctgctgcag cttgcagcga atttgatgag cagcagctac agcttgatg gctgccgagt  
3600

agagcgagtg ttgctatctg ttttttgttc tctttttcag aaatttcgcc cgcaaatttt  
3660

aaatttgaat tcaaattttt aaaagaacta gcaaatatgc ccgtgcgttg caccgggtga  
3720

atatcaaaca aatattgatg ggtaagattg cttgtgtact tataacacat atgcacaaaa  
3780

atattgaata tgtacatacc tcgcaaatat ctccaaattt tatacatatg agttgtgtaa  
3840

atcgtgtgag ttccatattg tcatgttgat atggagtatt actgatgagc ccatttatgg  
3900

tgataatttt ggaggttgta gctcaacgaa tttgtatttg ctatgtatct caacgttgat  
3960

aagtcactac cacaaccatc ggcgacctt ctccgggatcc aagcatgttg accccgccaa  
4020

cgtggcgctg gtgcagggca ccgagatgaa caccacgggg ctatgtgcct gtccagggtc  
4080

atcctaggct taaggccacg acactcaagg acgtggtggg cggcgtcgcg gaggtgctcc  
4140

aagcgaacaa gctggccacc aaggaggacg ccgacaaggt ggcggccacc gctatgcaga  
4200

acgatgggag gcacgccggt gacgacaagg agctaacacg atccatttag tcccgatccg  
4260

agttgatcag gaattcaatc ctgcaccttg cggttacggt tttcttctcc gcgggaaaag  
4320

caatcaccga tggtagggac aaagtgtgtg tgagaacgga ggccaggcca aagtgcgtgc  
4380

gagaacggag gctaggccat cgctggattg gatttacgaa tgaaatatng atgtgacgaa  
4440

cagaaaatta tcagtttgat ttaattttca taatcgganc tctttaatag gaaaaaaaaat  
4500

tacatgtacg ttccttcattn gtgcccatgt ccatccggga gtccaggttt attcncaaag  
4560

ncncaatcaa cagctannaa tccatgtcct tccccgccgt tccctactct gctttttttt  
4620

ctttcatttg aaaccttccg ctatgaattt ctagtcgttc ctagcatcca cgcacacaaa  
4680

atagatttcc ctgcgaaggc aaaacataca aatatgagtg catgcaagat attacaaacc  
4740

caatccatta aaaatagaac ataattaact ttagcctacc tatctcaata ttggtatatg  
4800

cccaaactca aaaggagaaa aancaaacta aaacttttaa taaagtgacc ccaagagata  
4860

aaaagggtgat agtaacaaca aaatctcact tgacaatgtc gttgatcagc actattttta  
4920

aatattactt aaaaatcttt atatttacct attaaaacaa tgaaaaacag aagatgtttc  
4980

ttttttatatt acaacagcgt tgtatttagt catgtcctat ctaagagaga aaaatgaatt  
5040

taacgaaaag aagctcagaa aaaaaaaaga gaacagggcc accacaccag taatccctat  
5100

gttatcaatg aaaaaaaatt tcaatgctag gttttttata agaaaagggtg ataaagtgtt  
5160

gaaaaatata gcaggaaatt atatatcttg ctggtttaac attaattcaa gcatatagat  
5220

ataaaaaatat atcaggctag gaaaggaaaa ggataaaatt ggagagaaaa aggaaaagaa  
5280

cagtagagga taaccagcaa aaagatgaaa ggattcgaac ccatgaccta gcgttacaat  
5340

tgtttcacag gctaaccaat cgagaatcat cgacgtagtg taatcttgtag tagctacatt  
5400

tgaaaaaata tgttttgagc tgaacgttg tgtgtccgcc cctgcatccg atacatgttg  
5460

gagcgtggag cgcggttaata tctccttctc tctcgtcgtt ttctgctgtt ccccgctctt  
5520

ccttcgcaa cagccgagaa gaggcagaga gagcgccgcc ccccgctcct ctctctcct  
5580

ctcgtcctcg ccccatccc tctcgtcttt ccttgccgg cagcagagga ggcggcagcg  
5640

acggcttcag ctgctccac gggccggatc gggcagtggc ggtggcgtcg gcggcttcg  
5700

ctggcgaatc cggcgggtga atcgggtgaa atttgggtga ccccgatac aaatcagtgt  
5760

tccgataggt aataccctgc tctcagcatc tgcccttttg aattcgcaa gagccagcat  
5820

ctgccctttt gaattcgcaa agggccagca tctgccatt tgattttgaa ttcgccaaga  
5880

gccagcaaca gcgccccgc gccccctccc tctccgcaa taaacagcca cagcgccgc  
5940

ccccatgtcc accctcatcg ccacagcgca ccaccaccac caccaccacc accaccaccg  
6000

tctccagcc atg gcc tcc tcc gcc tcc ctg cag cgc ttc etc ccc ccg tac  
6051

Met Ala Ser Ser Ala Ser Leu Gln Arg Phe Leu Pro Pro Tyr  
1 5 10

ccc cac gcg gca gca tcc cgc tgc cgc cct ccc ggc gtc cgc gcc cgc  
6099

Pro His Ala Ala Ala Ser Arg Cys Arg Pro Pro Gly Val Arg Ala Arg  
15 20 25 30

ccc gtg cag tcg tcg acg gtg tcc gca ccg tcc tcc tcg act ccg gcg  
6147

Pro Val Gln Ser Ser Thr Val Ser Ala Pro Ser Ser Ser Thr Pro Ala  
35 40 45

gcg gac gag gcc gtg tcg gcg gag cgg ctg gag ccg cgg gtg gag cag  
6195

Ala Asp Glu Ala Val Ser Ala Glu Arg Leu Glu Pro Arg Val Glu Gln  
50 55 60

cgg gag ggc cgg tac tgg gtg ctc aag gag aag tac cgg acg ggg ctg  
6243

Arg Glu Gly Arg Tyr Trp Val Leu Lys Glu Lys Tyr Arg Thr Gly Leu  
65 70 75

aac ccg cag gag aag gtg aag ctg ggg aag gag ccc atg tca ttg ttc  
 6291  
 Asn Pro Gln Glu Lys Val Lys Leu Gly Lys Glu Pro Met Ser Leu Phe  
 80 85 90  
  
 atg gag ggc ggc atc aag gag ctc gcc aag atg ccc atg gag gag atc  
 6339  
 Met Glu Gly Gly Ile Lys Glu Leu Ala Lys Met Pro Met Glu Glu Ile  
 95 100 105 110  
  
 gag gcc gac aag ctc tcc aag gag gac atc gac gtg cgg ctc aag tgg  
 6387  
 Glu Ala Asp Lys Leu Ser Lys Glu Asp Ile Asp Val Arg Leu Lys Trp  
 115 120 125  
  
 ctc ggc ctc ttc cac cgc cgc aag cat cag t gtatgcctct cttctcttgc  
 6438  
 Leu Gly Leu Phe His Arg Arg Lys His Gln  
 130 135  
  
 tcctctgatac aacacatttt cttgctttcg ttcgggttatt tgtcgcgccg aggaagttaa  
 6498  
  
 ttgcgaaga tattctgcag ttttttttct cgatgcacat tcagcaacct aattaagact  
 6558  
  
 gattaagtgtg ctgtgatttt tatagcttaa ttacgggtctc gtgggtaatg actattttata  
 6618  
  
 ttgagtaaac atggttacct ttgatccaat cacttcacct ccatgtgccca tatatagcca  
 6678  
  
 caggctctac caagtaacac tagtaatatg cccgtgctac gacacgggtgg cataataaat  
 6738  
  
 cattaaattt tattataatc aaattaagga tcctaaaatt ggtccaattg ggtgttaatt  
 6798  
  
 cgatgcaggt catataaaaa tatatttttag gcaagggtgca attcaagagc atcaaccatt  
 6858  
  
 atatccaatc actttaatat atatttgaag ataacatatg tcggaaaaaa aatgatggag  
 6918  
  
 agctattttca ttaacttgtg agcataaaca gataccaga tgatgccacc ataagtcccg  
 6978  
  
 ccacagtaag tgatgcagct catcttgccc taggcgttcg gtctaaccag tagatagaaa  
 7038  
  
 gagtacaaca tagatcgaat gaaaaaaaaa atctccagaa gaaagctcaa ccacattgag  
 7098  
  
 taaattagag caacaatcaa atcgagtcag catatcggtta tgttagcaga accaatcacc  
 7158  
  
 acaatttggt tctcctcttt atctaagngt tttggccagg ttaaaagcat atatcactat  
 7218  
  
 gttccaagca aacatcggca atggacacgt caaaaataaa tgatcaattg tttctttgag  
 7278



tacaaaattg acaatggaca ctatgttcct ttgttagaat tctatttgtc agggtaggat  
7338

gtagaaaaac ttaactttta gaggaagctt aaatatccgg cataaacttg ctttttcagc  
7398

gctctataaa ataattcaac agtgaattgt ccatcttttc taagtgtcc aaaagacact  
7458

aagttgaaaa accaggtgaa ccaacagatt gatccacaaa atcttattat tagattattc  
7518

acttaaaagc ctgtctttat ttcaaacata taaaaacaga agttattaat caggggaagcg  
7578

cttatggcag cctgagcgaa ccagtgatag caagtgggta aaacagtaaa taggatacat  
7638

aaaaattata caaggtttct actgtttatc gaaaaaaaaat atttgaaaac agtaaatagg  
7698

atacataatc gaattccaac ttgtccttat cataacatcc agaatcacia caagaattgc  
7758

aacgaataca tagtcgactt gagctaagaa gtcacaagac ctgtcaaagt aagctgcctt  
7818

tgatcttgaa gtgaaaggca tattttattg tcttccttgg caaacagata tcaactgtctt  
7878

cagcagttca gttagataat ccaagatttc tcacggagaa gagcatatca ctcacatcag  
7938

tgttgtgccc tccaaatact gagataaact gaattttggt ctctttgaag catctgcagg  
7998

cattaacaat aataatactt tacaaagttt cattgggtct aaactattgt ttgcacatca  
8058

tatatatgcc cagaactttt tagcatgata caagggtcct gttcataact catgcctaaa  
8118

tctgacaaat ttgtcaaacg acaatataag tcgaattata atgcgtttta gaattgacgc  
8178

caaaactttt gctagcgtaa gtaactcttc cacctcccag catgcataca accaacaagc  
8238

taaacttttg ttcaaaaaaa tgtacattta tttccttgaa cacagccttt gtagaatatg  
8298

attaaaaact catggatgaa tgaaataatg taaaagaatg gtcaaaatga tgaatagtac  
8358

aagaagcaac tgtgaacatt tcacctttac ctgactgttc gcaagaaggc cacgtggcag  
8418

aaaagccaga aatgcaagaa gcttccttaa ttgatacacc atcaagaaat caatggactc  
8478

aacaccagcg tccgcccaga caaaatgaat gcaggcacct aaaatataga accattgact  
8538

tttcaacact gaattatata acctgaatat cttgttttgt taacacatct gacaaaatca  
8598

gtgcattctg ttccatatag atgtatgcat agctcccata tgtagttga tcgatgagca  
8658

tgcaaactat acacacctta cgttactccc tctgtcaaaa aaaatataag cttgtctaga  
8718

tacatagcta caaatgctta tatttttggg ttctcttaaa gctgtagaaa cttttatcgc  
8778

cccgccatgg caagtcgagc tgccatcccc aatgaaagcc cccacacagg tttcatgccc  
8838

tgctgcacaa tattgagcaa ccaaaaatat aataatattt gtgtcagaat ttgaatcaac  
8898

cttacagata ctgggtggcc agaaaatcta gtccaagtaa tatcctgaaa aatagcaact  
8958

ggcaaatact aaaggcagtg aagagtttcc tttagatcag atgataaaaa aaaatcatat  
9018

gttcaatagc aataatcact cacatttttt ttgctgttta gaatttagat aaatagtagt  
9078

taaacttcta tagcttgctg agctaagatc aatgggtgatt attagttgaa aaaataatca  
9138

aatcatcaaa ctgaggagac ttatacctgc cataagttct gaaatttcaa tgatcctagt  
9198

caatatttac tgtatatata gaattaggtc caaaagatga tacttacaat taaggatgtt  
9258

gtattgatcg gttcataact caagcttcta tttatcatta atcaaaagct ggatcattca  
9318

tgcatatacc tttgccgcac tcaacatagc agctcggagt cttctttgtt cagaagcgag  
9378

gaaggagtca acaaataagt actgcaatgt taaacaaacc gacatatcaa atcccaaatt  
9438

aagaatgcat gatttattaa tacaggaaat atatgatcaa gtcccaaaaa gtgagtcatg  
9498

ttatgtacac tcagtcatca atttcaataa gaatattaac ttgctcattg gtatatggat  
9558

ttgattatga cataatttga caatacattt acagaataaa cttgcagtgc tgtgagcata  
9618

tgttactaac atgtaaggac cttgttttgc tctgttcaat actcatgttg atcttgatct  
9678

gtgtccacat atacctaaat gaaatgaaat caaagaatga ggtttgtagg agtggagttg  
9738

gtgaattata gggtagataa tgctggcaca accgtttgat aagtagtacg agtactttat  
9798

ttggcgccac cgcgccagca tcagatgtgt ggcctttgca ctgattgaac ccaaaagaaa  
9858

aaaaaaagtc gttttgggtcc cacacaattc tacttcatct gcaggatgta cagaaggtta  
9918

catatctatt ctgttctatg ctctgtttac atttataagg gctcacttgg tggctgtcat  
9978

tggttggtcg gtgcggtata ttactaatag gttttttaat ggcataatg ttcttaaaat  
10038

aaaccagaaa agcaaaagat caactatctt agccacacca atgaaatgga atatactgaa  
10098

ctgtcacggc taaaattctc ttcagtcacc tggcccagct ggagccgtgg gctcgtcgtc  
10158

ttttctaaac atgtactagt attttggggg cccacagtga atttggccca aaatgctgac  
10218

agccgctcta cggctctacg ctgtgcag at ggg cgg ttc atg atg cgg ctg  
10269

Tyr Gly Arg Phe Met Met Arg Leu  
140

aag ctg cca aac ggt gtg acg acg agc gag cag acg agg tac ctg gcg  
10317

Lys Leu Pro Asn Gly Val Thr Thr Ser Glu Gln Thr Arg Tyr Leu Ala  
145 150 155 160

agc gtg atc gag gcg tac ggc aag gag ggc tgc gcc gac gtg aca acc  
10365

Ser Val Ile Glu Ala Tyr Gly Lys Glu Gly Cys Ala Asp Val Thr Thr  
165 170 175

cgc cag aac tgg cag atc cgc ggc gtc acg ctc ccc gac gtg ccg gcc  
10413

Arg Gln Asn Trp Gln Ile Arg Gly Val Thr Leu Pro Asp Val Pro Ala  
180 185 190

atc ctc gac ggg ctc aac gcc gtc ggc ctc acc agc ctc cag agc ggc  
10461

Ile Leu Asp Gly Leu Asn Ala Val Gly Leu Thr Ser Leu Gln Ser Gly  
195 200 205

atg gac aac gtc cgc aac ccc gtc ggc aac ccg ctc gcc ggc atc gac  
10509

Met Asp Asn Val Arg Asn Pro Val Gly Asn Pro Leu Ala Gly Ile Asp  
210 215 220

ccc gac gag atc gtc gac acg cga tcc tac acc aac ctc ctc tcc tcc  
10557

Pro Asp Glu Ile Val Asp Thr Arg Ser Tyr Thr Asn Leu Leu Ser Ser  
225 230 235 240

tac atc acc agc aac ttc cag ggc aac ccc acc atc acc aac ct

10601

Tyr Ile Thr Ser Asn Phe Gln Gly Asn Pro Thr Ile Thr Asn Leu  
245 250

gtgagtgatc gaatcaactt gatcatgctc tgtgctgtgc tgttcgtgtc gtctctgacg

10661

acatgtttgt tgaatttggt gttgctgctg gctggtggca g g ccg agg aag tgg

10715

Pro Arg Lys Trp

aac gtg tgc gtg atc ggg tcg cac gat ctg tac gag cac ccg cac atc

10763

Asn Val Cys Val Ile Gly Ser His Asp Leu Tyr Glu His Pro His Ile  
260 265 270 275

aac gac ctc gcg tac atg ccg gcg gtg aag ggc ggc aag ttc ggg ttc

10811

Asn Asp Leu Ala Tyr Met Pro Ala Val Lys Gly Gly Lys Phe Gly Phe  
280 285 290

aac ctc ctt gtc ggc ggg ttc atc agc ccc aag agg tgg gag gag gcg

10859

Asn Leu Leu Val Gly Gly Phe Ile Ser Pro Lys Arg Trp Glu Glu Ala  
295 300 305

ctg ccg ctg gac gcc tgg gtc ccc ggc gac gac atc atc ccg gtg tgc

10907

Leu Pro Leu Asp Ala Trp Val Pro Gly Asp Asp Ile Ile Pro Val Cys  
310 315 320

aag gcc gtt ctc gag gcg tac cgc gac ctc ggc acc agg ggc aac cgc

10955

Lys Ala Val Leu Glu Ala Tyr Arg Asp Leu Gly Thr Arg Gly Asn Arg  
325 330 335

cag aag acc cgc atg atg tgg ctc atc gac gaa ctt gtgagcctcc

11001

Gln Lys Thr Arg Met Met Trp Leu Ile Asp Glu Leu  
340 345 350

attcatccac gccattgact gaattacgta tgtcccaatg ttcttatcag ttaattgcgg

11061

tggtggcatt gcag gga atg gag gct ttt cgg tcg gag gtg gag aag agg

11111

Gly Met Glu Ala Phe Arg Ser Glu Val Glu Lys Arg  
355 360

atg ccg aac ggc gtg ctg gag cgc gct gcg ccg gac gac ctc atc gac

11159

Met Pro Asn Gly Val Leu Glu Arg Ala Ala Pro Asp Asp Leu Ile Asp  
365 370 375

aag aaa tgg cag agg agg gac tac ctc ggc gtg cac ccg cag aag cag

11207

Lys Lys Trp Gln Arg Arg Asp Tyr Leu Gly Val His Pro Gln Lys Gln  
380 385 390 395

gaa ggg atg tcc tac gtc ggc ctg cac gtg ccc gtc ggc cgg gtg cag  
11255

Glu Gly Met Ser Tyr Val Gly Leu His Val Pro Val Gly Arg Val Gln  
400 405 410

gcg gcg gac atg ttc gag ctc gcc cgc ctt gcc gac gag tat ggc tcc  
11303

Ala Ala Asp Met Phe Glu Leu Ala Arg Leu Ala Asp Glu Tyr Gly Ser  
415 420 425

ggc gag ctc cgc ctc acc gtg gag cag aac atc gtg atc ccg aac gtc  
11351

Gly Glu Leu Arg Leu Thr Val Glu Gln Asn Ile Val Ile Pro Asn Val  
430 435 440

aag aac gag aag gtg gag gcg ctg ctc gcc gag ccg ctg ctt cag aag  
11399

Lys Asn Glu Lys Val Glu Ala Leu Leu Ala Glu Pro Leu Leu Gln Lys  
445 450 455

ttc tcc ccg cag ccg tcg ctg ctg ctc aag ggc ctg gtc gcg tgc acc  
11447

Phe Ser Pro Gln Pro Ser Leu Leu Leu Lys Gly Leu Val Ala Cys Thr  
460 465 470 475

ggc aac cag ttc tgc ggc cag gcc atc atc gag acg aag cag ccg gcg  
11495

Gly Asn Gln Phe Cys Gly Gln Ala Ile Ile Glu Thr Lys Gln Arg Ala  
480 485 490

ctg ctg gtg acg tcg cag gtg gag aag ctc gtg tcg gtg ccc ccg gcg  
11543

Leu Leu Val Thr Ser Gln Val Glu Lys Leu Val Ser Val Pro Arg Ala  
495 500 505

gtg ccg atg cac tgg acc ggc tgc ccc aac agc tgc ggc cag gtg cag  
11591

Val Arg Met His Trp Thr Gly Cys Pro Asn Ser Cys Gly Gln Val Gln  
510 515 520

gtc gcc gac atc ggc ttc atg ggc tgc ctc acc aag gat agc gcc ggc  
11639

Val Ala Asp Ile Gly Phe Met Gly Cys Leu Thr Lys Asp Ser Ala Gly  
525 530 535

aag atc gtc gag gcg gcc gac atc ttc gtc ggc ggc cgc gtc ggc agc  
11687

Lys Ile Val Glu Ala Ala Asp Ile Phe Val Gly Gly Arg Val Gly Ser  
540 545 550 555

gac tcg cac ctc gcc ggc gcg tac aag aag tcc gtg ccg tgc gac gag  
11735

Asp Ser His Leu Ala Gly Ala Tyr Lys Lys Ser Val Pro Cys Asp Glu  
560 565 570

ctg gcg ccg atc gtc gcc gac atc ctg gtc gag ccg ttc ggg gcc gtg  
11783

Leu Ala Pro Ile Val Ala Asp Ile Leu Val Glu Arg Phe Gly Ala Val  
575 580 585

cgg agg gag agg gag gag gac gag gag tag gagcacagac tgggggtggtt  
11833  
Arg Arg Glu Arg Glu Glu Asp Glu Glu  
590 595

tgtttgctcc ggtgatctct cgccgtcctt gtaaagtaga cgacaatatg ctttcgcca  
11893

tggcacgctt gtactgtcac gttttgggtt gatctttagt cccaaaagtt gtgttcattc  
11953

tcgttacagt cttacagagg atgattgatt gataaataaa naagaaacag attctgcaac  
12013

tgttcacgct tgttcctaaa tctgatttcg cgatagtatc ttgtctgacc tgtcccaatc  
12073

gcagtgctaa aaccatataa tcttgcaagc aaatgaaatt gaaagagttc aatgcaacca  
12133

ctaacggtct aacaacatga taaggcct  
12161

<210> 2  
<211> 2519  
<212> DNA  
<213> Oryza sativa

<220>  
<221> CDS  
<222> (532)..(2322)  
<223>

<400> 2  
tatctccttc tctctcgtcg ctttctgcgt ctccccgtct ctcttcgcc aacagccgag  
60

aagaggcaga gagagcgccg cccccgtcc ctctctctcc ctctcgtcct cgtcccatc  
120

cctctcgtct ttcccttgcc ggcagcagag gaggcggcag cgacggcttc agctgctccc  
180

acgggcccga tcgggcagtg gcggtggcgt cggcggcttc cgctggcgaa tccggcgggt  
240

gaatcggtg aaatttgggt gacccccgat acaaatcagt gttccgatag gtaataccct  
300

gctctcagca tctgcccttt tgaattcgcc aagagccagc atctgccctt ttgaattcgc  
360

caagggccag catctgccca tttgattttg aattcgccaa gagccagcaa cagcgcctcc  
420

gcgccccctc cctcctccgc aataaacagc cacacgcgcc gccccatgt ccaccctcat  
480

cgccacagcg caccaccacc accaccacca ccaccaccac cgtctccagc c atg gcc  
537

Met Ala  
1

tcc tcc gcc tcc ctg cag cgc ttc ctc ccc ccg tac ccc cac gcg gca  
585  
Ser Ser Ala Ser Leu Gln Arg Phe Leu Pro Pro Tyr Pro His Ala Ala  
5 10 15

gca tcc cgc tgc cgc cct ccc ggc gtc cgc gcc cgc ccc gtg cag tcg  
633  
Ala Ser Arg Cys Arg Pro Pro Gly Val Arg Ala Arg Pro Val Gln Ser  
20 25 30

tcg acg gtg tcc gca ccg tcc tcc tcg act ccg gcg gcg gac gag gcc  
681  
Ser Thr Val Ser Ala Pro Ser Ser Ser Thr Pro Ala Ala Asp Glu Ala  
35 40 45 50

gtg tcg gcg gag cgg ctg gag ccg cgg gtg gag cag cgg gag ggc cgg  
729  
Val Ser Ala Glu Arg Leu Glu Pro Arg Val Glu Gln Arg Glu Gly Arg  
55 60 65

tac tgg gtg ctc aag gag aag tac ccg acg ggg ctg aac ccg cag gag  
777  
Tyr Trp Val Leu Lys Glu Lys Tyr Arg Thr Gly Leu Asn Pro Gln Glu  
70 75 80

aag gtg aag ctg ggg aag gag ccc atg tca ttg ttc atg gag ggc ggc  
825  
Lys Val Lys Leu Gly Lys Glu Pro Met Ser Leu Phe Met Glu Gly Gly  
85 90 95

atc aag gag ctc gcc aag atg ccc atg gag gag atc gag gcc gac aag  
873  
Ile Lys Glu Leu Ala Lys Met Pro Met Glu Glu Ile Glu Ala Asp Lys  
100 105 110

ctc tcc aag gag gac atc gac gtg cgg ctc aag tgg ctc ggc ctc ttc  
921  
Leu Ser Lys Glu Asp Ile Asp Val Arg Leu Lys Trp Leu Gly Leu Phe  
115 120 125 130

cac cgc cgc aag cat cag tat ggg cgg ttc atg atg cgg ctg aag ctg  
969  
His Arg Arg Lys His Gln Tyr Gly Arg Phe Met Met Arg Leu Lys Leu  
135 140 145

cca aac ggt gtg acg acg agc gag cag acg agg tac ctg gcg agc gtg  
1017  
Pro Asn Gly Val Thr Thr Ser Glu Gln Thr Arg Tyr Leu Ala Ser Val  
150 155 160

atc gag gcg tac ggc aag gag ggc tgc gcc gac gtg aca acc cgc cag  
1065  
Ile Glu Ala Tyr Gly Lys Glu Gly Cys Ala Asp Val Thr Thr Arg Gln  
165 170 175

aac tgg cag atc cgc ggc gtc acg ctc ccc gac gtg ccg gcc atc ctc  
1113  
Asn Trp Gln Ile Arg Gly Val Thr Leu Pro Asp Val Pro Ala Ile Leu

180	185	190
gac ggg ctc aac gcc gtc ggc ctc acc agc ctc cag agc ggc atg gac 1161		
Asp Gly Leu Asn Ala Val Gly Leu Thr Ser Leu Gln Ser Gly Met Asp 195 200 205 210		
aac gtc cgc aac ccc gtc ggc aac ccg ctc gcc ggc atc gac ccc gac 1209		
Asn Val Arg Asn Pro Val Gly Asn Pro Leu Ala Gly Ile Asp Pro Asp 215 220 225		
gag atc gtc gac acg cga tcc tac acc aac ctc ctc tcc tcc tac atc 1257		
Glu Ile Val Asp Thr Arg Ser Tyr Thr Asn Leu Leu Ser Ser Tyr Ile 230 235 240		
acc agc aac ttc cag ggc aac ccc acc atc acc aac ctg ccg agg aag 1305		
Thr Ser Asn Phe Gln Gly Asn Pro Thr Ile Thr Asn Leu Pro Arg Lys 245 250 255		
tgg aac gtg tgc gtg atc ggg tcg cac gat ctg tac gag cac ccg cac 1353		
Trp Asn Val Cys Val Ile Gly Ser His Asp Leu Tyr Glu His Pro His 260 265 270		
atc aac gac ctc gcg tac atg ccg gcg gtg aag ggc ggc aag ttc ggc 1401		
Ile Asn Asp Leu Ala Tyr Met Pro Ala Val Lys Gly Gly Lys Phe Gly 275 280 285 290		
ttc aac ctc ctt gtc ggc ggg ttc atc agc ccc aag agg tgg gag gag 1449		
Phe Asn Leu Leu Val Gly Gly Phe Ile Ser Pro Lys Arg Trp Glu Glu 295 300 305		
gcg ctg ccg ctg gac gcc tgg gtc ccc ggc gac gac atc atc ccg gtg 1497		
Ala Leu Pro Leu Asp Ala Trp Val Pro Gly Asp Asp Ile Ile Pro Val 310 315 320		
tgc aag gcc gtt ctc gag gcg tac cgc gac ctc ggc acc agg ggc aac 1545		
Cys Lys Ala Val Leu Glu Ala Tyr Arg Asp Leu Gly Thr Arg Gly Asn 325 330 335		
cgc cag aag acc cgc atg atg tgg ctc atc gac gaa ctt gga atg gag 1593		
Arg Gln Lys Thr Arg Met Met Trp Leu Ile Asp Glu Leu Gly Met Glu 340 345 350		
gct ttt cgg tcg gag gtg gag aag agg atg ccg aac ggc gtg ctg gag 1641		
Ala Phe Arg Ser Glu Val Glu Lys Arg Met Pro Asn Gly Val Leu Glu 355 360 365 370		
cgc gct gcg ccg gac gac ctc atc gac aag aaa tgg cag agg agg gac 1689		
Arg Ala Ala Pro Asp Asp Leu Ile Asp Lys Lys Trp Gln Arg Arg Asp 375 380 385		



tac ctc ggc gtg cac ccg cag aag cag gaa ggg atg tcc tac gtc ggc  
1737

Tyr Leu Gly Val His Pro Gln Lys Gln Glu Gly Met Ser Tyr Val Gly  
390 395 400

ctg cac gtg ccc gtc ggc cgg gtg cag gcg gcg gac atg ttc gag ctc  
1785

Leu His Val Pro Val Gly Arg Val Gln Ala Ala Asp Met Phe Glu Leu  
405 410 415

gcc cgc ctt gcc gac gag tat ggc tcc ggc gag ctc cgc ctc acc gtg  
1833

Ala Arg Leu Ala Asp Glu Tyr Gly Ser Gly Glu Leu Arg Leu Thr Val  
420 425 430

gag cag aac atc gtg atc ccg aac gtc aag aac gag aag gtg gag gcg  
1881

Glu Gln Asn Ile Val Ile Pro Asn Val Lys Asn Glu Lys Val Glu Ala  
435 440 445 450

ctg ctc gcc gag ccg ctg ctt cag aag ttc tcc ccg cag ccg tcg ctg  
1929

Leu Leu Ala Glu Pro Leu Leu Gln Lys Phe Ser Pro Gln Pro Ser Leu  
455 460 465

ctg ctc aag ggc ctg gtc gcg tgc acc ggc aac cag ttc tgc ggc cag  
1977

Leu Leu Lys Gly Leu Val Ala Cys Thr Gly Asn Gln Phe Cys Gly Gln  
470 475 480

gcc atc atc gag acg aag cag ccg gcg ctg ctg gtg acg tcg cag gtg  
2025

Ala Ile Ile Glu Thr Lys Gln Arg Ala Leu Leu Val Thr Ser Gln Val  
485 490 495

gag aag ctc gtg tcg gtg ccc ccg gcg gtg ccg atg cac tgg acc ggc  
2073

Glu Lys Leu Val Ser Val Pro Arg Ala Val Arg Met His Trp Thr Gly  
500 505 510

tgc ccc aac agc tgc ggc cag gtg cag gtc gcc gac atc ggc ttc atg  
2121

Cys Pro Asn Ser Cys Gly Gln Val Gln Val Ala Asp Ile Gly Phe Met  
515 520 525 530

ggc tgc ctc acc aag gac agc gcc ggc aag atc gtc gag gcg gcc gac  
2169

Gly Cys Leu Thr Lys Asp Ser Ala Gly Lys Ile Val Glu Ala Ala Asp  
535 540 545

atc ttc gtc ggc ggc cgc gtc ggc agc gac tcg cac ctc gcc ggc gcg  
2217

Ile Phe Val Gly Gly Arg Val Gly Ser Asp Ser His Leu Ala Gly Ala  
550 555 560

tac aag aag tcc gtg ccg tgc gac gag ctg gcg ccg atc gtc gcc gac  
2265

Tyr Lys Lys Ser Val Pro Cys Asp Glu Leu Ala Pro Ile Val Ala Asp  
565 570 575

atc ctg gtc gag cgg ttc ggg gcc gtg cgg agg gag agg gag gag gac  
 2313  
 Ile Leu Val Glu Arg Phe Gly Ala Val Arg Arg Glu Arg Glu Glu Asp  
 580 585 590

gag gag tag gagcacagac tgggggtgggtt tgcttgctcc ggtgatctct  
 2362  
 Glu Glu  
 595

cgccgtcctt gtaaagtaga cgacaatatg ccttcgcccc tggcacgctt gtactgtcac  
 2422

gttttggttt gatctttag cccaaaagtt gtgttcattc tcgttacagt cttacagagg  
 2482

atgattgatt gataaataaa gaagaaacag attctgc  
 2519

<210> 3  
 <211> 596  
 <212> PRT  
 <213> Oryza sativa

<400> 3  
 Met Ala Ser Ser Ala Ser Leu Gln Arg Phe Leu Pro Pro Tyr Pro His  
 1 5 10 15  
 Ala Ala Ala Ser Arg Cys Arg Pro Pro Gly Val Arg Ala Arg Pro Val  
 20 25 30  
 Gln Ser Ser Thr Val Ser Ala Pro Ser Ser Ser Thr Pro Ala Ala Asp  
 35 40 45  
 Glu Ala Val Ser Ala Glu Arg Leu Glu Pro Arg Val Glu Gln Arg Glu  
 50 55 60  
 Gly Arg Tyr Trp Val Leu Lys Glu Lys Tyr Arg Thr Gly Leu Asn Pro  
 65 70 75 80  
 Gln Glu Lys Val Lys Leu Gly Lys Glu Pro Met Ser Leu Phe Met Glu  
 85 90 95  
 Gly Gly Ile Lys Glu Leu Ala Lys Met Pro Met Glu Glu Ile Glu Ala  
 100 105 110  
 Asp Lys Leu Ser Lys Glu Asp Ile Asp Val Arg Leu Lys Trp Leu Gly  
 115 120 125  
 Leu Phe His Arg Arg Lys His Gln Tyr Gly Arg Phe Met Met Arg Leu  
 130 135 140  
 Lys Leu Pro Asn Gly Val Thr Thr Ser Glu Gln Thr Arg Tyr Leu Ala  
 145 150 155 160  
 Ser Val Ile Glu Ala Tyr Gly Lys Glu Gly Cys Ala Asp Val Thr Thr  
 165 170 175  
 Arg Gln Asn Trp Gln Ile Arg Gly Val Thr Leu Pro Asp Val Pro Ala  
 180 185 190

Ile	Leu	Asp	Gly	Leu	Asn	Ala	Val	Gly	Leu	Thr	Ser	Leu	Gln	Ser	Gly	195	200	205
Met	Asp	Asn	Val	Arg	Asn	Pro	Val	Gly	Asn	Pro	Leu	Ala	Gly	Ile	Asp	210	215	220
Pro	Asp	Glu	Ile	Val	Asp	Thr	Arg	Ser	Tyr	Thr	Asn	Leu	Leu	Ser	Ser	225	230	235
Tyr	Ile	Thr	Ser	Asn	Phe	Gln	Gly	Asn	Pro	Thr	Ile	Thr	Asn	Leu	Pro	245	250	255
Arg	Lys	Trp	Asn	Val	Cys	Val	Ile	Gly	Ser	His	Asp	Leu	Tyr	Glu	His	260	265	270
Pro	His	Ile	Asn	Asp	Leu	Ala	Tyr	Met	Pro	Ala	Val	Lys	Gly	Gly	Lys	275	280	285
Phe	Gly	Phe	Asn	Leu	Leu	Val	Gly	Gly	Phe	Ile	Ser	Pro	Lys	Arg	Trp	290	295	300
Glu	Glu	Ala	Leu	Pro	Leu	Asp	Ala	Trp	Val	Pro	Gly	Asp	Asp	Ile	Ile	305	310	315
Pro	Val	Cys	Lys	Ala	Val	Leu	Glu	Ala	Tyr	Arg	Asp	Leu	Gly	Thr	Arg	325	330	335
Gly	Asn	Arg	Gln	Lys	Thr	Arg	Met	Met	Trp	Leu	Ile	Asp	Glu	Leu	Gly	340	345	350
Met	Glu	Ala	Phe	Arg	Ser	Glu	Val	Glu	Lys	Arg	Met	Pro	Asn	Gly	Val	355	360	365
Leu	Glu	Arg	Ala	Ala	Pro	Asp	Asp	Leu	Ile	Asp	Lys	Lys	Trp	Gln	Arg	370	375	380
Arg	Asp	Tyr	Leu	Gly	Val	His	Pro	Gln	Lys	Gln	Glu	Gly	Met	Ser	Tyr	385	390	395
Val	Gly	Leu	His	Val	Pro	Val	Gly	Arg	Val	Gln	Ala	Ala	Asp	Met	Phe	405	410	415
Glu	Leu	Ala	Arg	Leu	Ala	Asp	Glu	Tyr	Gly	Ser	Gly	Glu	Leu	Arg	Leu	420	425	430
Thr	Val	Glu	Gln	Asn	Ile	Val	Ile	Pro	Asn	Val	Lys	Asn	Glu	Lys	Val	435	440	445
Glu	Ala	Leu	Leu	Ala	Glu	Pro	Leu	Leu	Gln	Lys	Phe	Ser	Pro	Gln	Pro	450	455	460
Ser	Leu	Leu	Leu	Lys	Gly	Leu	Val	Ala	Cys	Thr	Gly	Asn	Gln	Phe	Cys	465	470	475
Gly	Gln	Ala	Ile	Ile	Glu	Thr	Lys	Gln	Arg	Ala	Leu	Leu	Val	Thr	Ser	485	490	495
Gln	Val	Glu	Lys	Leu	Val	Ser	Val	Pro	Arg	Ala	Val	Arg	Met	His	Trp	500	505	510

Thr Gly Cys Pro Asn Ser Cys Gly Gln Val Gln Val Ala Asp Ile Gly  
515 520 525

Phe Met Gly Cys Leu Thr Lys Asp Ser Ala Gly Lys Ile Val Glu Ala  
530 535 540

Ala Asp Ile Phe Val Gly Gly Arg Val Gly Ser Asp Ser His Leu Ala  
545 550 555 560

Gly Ala Tyr Lys Lys Ser Val Pro Cys Asp Glu Leu Ala Pro Ile Val  
565 570 575

Ala Asp Ile Leu Val Glu Arg Phe Gly Ala Val Arg Arg Glu Arg Glu  
580 585 590

Glu Asp Glu Glu  
595

<210> 4  
<211> 12179  
<212> DNA  
<213> Oryza sativa

<220>  
<221> exon  
<222> (6001)..(6409)  
<223>

<220>  
<221> exon  
<222> (10255)..(10609)  
<223>

<220>  
<221> exon  
<222> (10712)..(11000)  
<223>

<220>  
<221> exon  
<222> (11094)..(11831)  
<223>

<400> 4  
ctcgagcttt tttgactgcc ctaatcaggc gggttccttg tgggacccac ataatgcttt  
60

ttttaatcgc cttcacgggc tgcattgcaaa ctatacggcg tgggtacttcc actactagaa  
120

aaaacgggct tttcgcaggc gggcaaacct tccgcatgta tattaacgac cgtaaaaatc  
180

tccaattttc acagggtggac cccagcaccg cctgcgaaaa taattttcgc aggctgcatt  
240

tcgaatcttc ctgggtgcta cagtaaacca cctgcgaaaa tactcacggc gccaaaaaaa  
300

aaatttccgc cagccccgcc ccctccctat tcaaatacaca aattctcaca aatctcatcc  
360

aaaaacaaaa ttcaatccaa aaatccatac atcaacacaa agcattggat tcaaataccac  
420

aacatcaatt tacaagttaa catcaatcaa catgtaagct ttaaaacgaa acgtcgtcgt  
480

cgccggcaaa ctctttttgc atgcggtgcc gccgccgcc ccctcccccc tctgtccgga  
540

tttgggaggg agggaggtgt ttgccgccac caccgccctc ccctctcttc gtagggccgg  
600

atctcgggag ggaggagagg ggagccgcct ccgcacagcc atcaacgtcc gtgccgccgt  
660

cgctctgttc gcaccaccgc cgttgcttcc ctctctccgg ccagatctag gagcggggag  
720

gaagagaggg ggagccaccg ccaccgtcgc cccctcgcgt ccgcgccgtc gtcaccgtcc  
780

acgccgccgc gtccgtgccg ccgctgtcgc tccccctct ctggcgagga gggagagaga  
840

gggagccgtc gcgccgccgt cgctccccct ctctggcgag gaggagagaga gggggagggg  
900

agaggggatgg aggggaggag agtggcgctg agagagagag agagagacgc tgaggagagg  
960

aaatgagtgg tggggagggg tggaggagaa gataaggagg acttagattt tttttttggg  
1020

taagtatgat ttttgcaggc ggaccacata aggttccgcc tgcgaaaatc aattttttcg  
1080

cgcagaccac ttaagaggtc cgcattgcga aataaaggta ttttttttagg cggacctctt  
1140

aagtgggtccg cctggaaaaa ttgattttcg caagcggatg acgaaaattc accccggttt  
1200

atattttcga agatgcttca tcgacgacat cgactgcgtc ctctatgaca gcaacgaccg  
1260

cgtcaccgac gacggcatcg atcacgtcat ctacgatgac aatgactgca tcaactccgc  
1320

atcactattg tgatgactgt tacacggcgt agaagaacca accaaagtgg tggcttcac  
1380

gccaacgacg tcctctaaca tatgcaagac gtccccaatg gcatcctctg acatctacaa  
1440

ggtgcaagat gctaacaatt acagtttttg tcttcacact gtggcataaa tatttttttt  
1500

caccttcggc tatatgcggc tacacctaca accacgggta ctacatgatc ggctccatca  
1560

acgaacatct ataacaacaa tcattgatgg aaactctagt caaagcgtct gtgtcatcgc  
1620

tatcatccat gacactcccg ctatgactac gtgaggggaat agataagagt caagggacga  
1680

cacggaagga gacgtaggca ccagggtggag gaccatccat caaagatgca attgatgatg  
1740

gtgagttgaa gaagatgaag aaataaaaata tttcaaatcc agtcgcaatc attcgcttcg  
1800

ctcccgttac gactgagggg gaatgttaga agcatagata tattaattgg agataagagt  
1860

catacaaata tagagataag atatcctcct agagatagaa tcctagagat aaaatatagt  
1920

cctagagata aatctactct tacttgtacc cctatatata ccccatgaga ggatcaatgc  
1980

aatacaccca gaatacaaca attagatfff tctacgggtg taactataat acgctgtaat  
2040

atgctggatc ggggaagagc gcccgtaatc agtgccccag agatgtaggt ctcggttgaa  
2100

ctccattatc aaataccgta cctcgggtgc gtcacatgtt ttgaatcttc tatgacgttt  
2160

cttttgcatt cgggttttcga tgtgacttcg gggctgggtt tataacaatg attatagtgc  
2220

tgttgacggc aatcgggtgt gagaattagc tattcgggtc cctccatgtg attttcttgt  
2280

gattgggatg tatggtaatg ctagggtttt aagggtgtagg attggtgcat gagagatcat  
2340

cacttcactt gtatgacctt ctctcctttt atattttttt atcattctct cctttttttt  
2400

ataatgctac tgaactagtg gaatacaggg gactaatgca aaataaaaaga aaagtatcac  
2460

tggtcacggc atataattta gaaagtgtgt gatttaggca tagggctgac catgaccctt  
2520

tacgacttgg tcgctcgggt tgtagacga tagatcaacc aacaaaagct acgatacatg  
2580

atgtacgtgt caggatacaa atccttacia ataacaacag ttattgttcg ataactatca  
2640

gttgtctagg cttaccaatg tataatagaa gatgaaaatt ccatattact ggtatcgttc  
2700

aatgctagta actctttgag ctttgtctag gttaaaaaaa aaattatgga tccaccatca  
2760

caaaaatgaa aaacaccggg gaaaacaaaa aaccatttga tagcagcaca agacaaaatg  
2820

atgttaccgt ctacccgagc tcctactccg taccagcaca accaaacgaa cagtaccgcg  
2880

cggaccaggg gcacgttcgt aaatttcctt cccgtggctg gctggctgcc atctctctca  
2940

accaggggtg gtaatttcgg ccgtttcggg gggccccgat agtaaatgag ctccgggtcaa  
3000

aacgccttcc gctcccttc attgcgcgcg acgcacaccg catctagatc cagatcgaaa  
3060

aaatcgctat ctgcgcgagt cgccagtcac cgctcgcagc ccggtcgccg taccgcgcggc  
3120

gctgcacgcc cccctccaag ccgtcgcccc atcgccccca gccgcccagt ggtggggcgg  
3180

cggatgccga gcttggcgag gttgccgagg acgaaccagg cgaggaggac gaggatcttg  
3240

tcgacgagcc agagcgggag ccacgccatg agcaacacgg cgagctcgaa cgtggacttg  
3300

ccgagcacct cgccagggag gacgtggacg gcgtcgcgca ccaccatcgc cgggagggcg  
3360

ctgtggtcgc acaggtcgag cgacaccacc atgccggagt tgccgcaccc gacgacgagc  
3420

accttcttgc cgcggtacgc ctgcgccgac ttgtagaccg cgacatgcat cacctcgctg  
3480

ctatatattgt tcttggaactg tggagacttg ctgtcagtgg gtgtgttcag aattgctgct  
3540

gcagcttgca gcgaatttgt gatgcagcag ctgcagcttg tatggctgcc gagtagagcg  
3600

agtgttgcta tctgtttttg ttctcttttt cagaaatttc gcccgcaaatt tttaaatttg  
3660

aattcaaatt tttaaaagaa ctagaaaata tgcccgtgcg ttgcaccggg tgaatatcaa  
3720

acaaatattg atgggtaaga ttgcttgtgt acttataaca catatgcaca aaaatattga  
3780

atatgtacat acctcgcaaa tatctccaaa ttttatacat atgagttgtg taaatcatgt  
3840

gagttccata ttgtcatgtt aatatggagt attactgatg agcccatcta tggtgataat  
3900

tttgagggtt gtagctcaac gaatttgtat ttgctatgta tctcaacggt gataagtcac  
3960

tactacaacc atcggcgacc tttctcgga tccaagcatg tcgaccccgcc caacgtggcg  
4020

tcggtgcagg gcaccgagat gaacaccacg gggctatttg cctgtccagg gtcacccatg  
4080

gcttaaggcc acgacactca aggacgtggt aggcggcgct acagagggtg tcccagcgaa  
4140

caagctggcc accaaggagg acgccgacaa ggtggcgcc accgctatgc agaaacgatg  
4200

ggaggcatgc cgggtgacgac aaggagctaa cagcatccat ttagtcccga tccgagttaa  
4260

tcaggaattc aatcctgcac cgtgcggtta cgtttttctt ttccgcggga aaagcaatca  
4320

ccgatggtag ggacaaagtg cgtgtgagaa cagaggccag gccaaagtgc gtgcgagaa  
4380

ggaggctagg ccacgctgg attggattta cgaatgaaat atcgatgtga cgaacagaaa  
4440

attatcagtt tgatttaatt ttcataatca gaactcttta ataggaaaaa aattacatgt  
4500

acgttccttc atcgtgcccc tgtccatctg ggagtccagg tttattcaca aagaccaat  
4560

caacagccag gaatccatgt ccttccccgc cgttccttac tctgcttttt tttctttcat  
4620

ttgaaacctt ccgctatgaa tttctagtcg ttcttagcat ccacgcacac aaaatagatt  
4680

tccttcgcaa ggcaaaacat acaaatatga gtgcatgcaa gatattacaa acccaatcca  
4740

ttaaaaatag aaaataatta actttagcct acctatctca atattggtat atgccccaa  
4800

tcaaaaggag aaaaaccaa ctaaaacttt taataaagtg aaccaagag ataaaaagg  
4860

gatagtaaca acaaaatctc acttgacaat gtcgttaatc aacactgttt ttaaataatta  
4920

cttaaaaatc tttatatatta cctattaaaa caatgaaaaa cagaagatgt ttctttttta  
4980

tttacaacag cgttgatatt agtcatgtcc tatctaagag agaaaaatga atttaacgaa  
5040

aagaagctca gaaaaaaaaa gagaacagg ccaccacacc agtaatccct atgttatcaa  
5100



tgaaaaaaaaaa tttcaatgct aggttttttta taagaaaagg tgataaagtg ttgaaaaaat  
5160

acagcaggaa attatatatc ttgctggttt aacatgaatt caagcatata gatataaaaa  
5220

tatatcaggc taggaaagga aaaggataaa attggagaga aaaaggaaaa gaacagtaga  
5280

ggataaccag caaaaagatg aaaggattcg aacccatgac ctagcgggtac aattgtttca  
5340

caggctaacc aattgagaat catcgacgtt gtgtcatctt gtgtagctac atttgaaaaa  
5400

atatgttttg agctgaacgt tgggtgtgtcc gcccttgcac ccgatacatg ttggagcgtg  
5460

gagcgcggta aagaaaaaat cctatcgaac cttatctcct tctctctcgt cgcttttctgc  
5520

gtctccccgt ctctccttcg ccaacagccg agaagaggca gagagagcgc cgccccccgt  
5580

ccctctctct ccctctcgtc ctgcgcccca tccctctcgt ctttcccttg ccggcagcag  
5640

aggaggcggc agcgacggct tcagctgctc ccacgggccc gatcgggcag tggcgggtggc  
5700

gtcggcggct tccgctggcg aatccggcgg gtggatacaa atcagtgttc cgataggtaa  
5760

aaccctgctc tcagcatctg cccttttgaa ttcgccaaga gccagcatct gcccttttga  
5820

attcgccaag ggccagcatc tgcccatttg attttgaatt cgccaagagc cagcaacagc  
5880

gccccgcgc cccctccctc ctccgcaata aacagccaca cgcgccgccc ccatgtccac  
5940

cctcatcgcc acagcgcacc accaccacca ccaccaccac caccaccacc gtctccagcc  
6000

atg gcc tcc tcc gcc tcc ctg cag cgc ttc ctc ccc ccg tac ccc cac  
6048

Met	Ala	Ser	Ser	Ala	Ser	Leu	Gln	Arg	Phe	Leu	Pro	Pro	Tyr	Pro	His
1				5					10					15	

gcg gca gca tcc cgc tgc cgc cct ccc ggc gtc cgc gcc cgc ccc gtg  
6096

Ala	Ala	Ala	Ser	Arg	Cys	Arg	Pro	Pro	Gly	Val	Arg	Ala	Arg	Pro	Val
			20					25					30		

cag tcg tcg acg gtg tcc gca ccg tcc tcc tcg act ccg gcg gcg gac  
6144

Gln	Ser	Ser	Thr	Val	Ser	Ala	Pro	Ser	Ser	Ser	Thr	Pro	Ala	Ala	Asp
			35				40					45			

gag gcc gtg tgc gcg gag cgg ctg gag ccg cgg gtg gag cag cgg gag  
6192  
Glu Ala Val Ser Ala Glu Arg Leu Glu Pro Arg Val Glu Gln Arg Glu  
50 55 60

ggc cgg tac tgg gtg ctc aag gag aag tac cgg acg ggg ctg aac ccg  
6240  
Gly Arg Tyr Trp Val Leu Lys Glu Lys Tyr Arg Thr Gly Leu Asn Pro  
65 70 75 80

cag gag aag gtg aag ctg ggg aag gag ccc atg tca ttg ttc atg gag  
6288  
Gln Glu Lys Val Lys Leu Gly Lys Glu Pro Met Ser Leu Phe Met Glu  
85 90 95

ggc ggc atc aag gag ctc gcc aag atg ccc atg gag gag atc gag gcc  
6336  
Gly Gly Ile Lys Glu Leu Ala Lys Met Pro Met Glu Glu Ile Glu Ala  
100 105 110

gac aag ctc tcc aag gag gac atc gac gtg cgg ctc aag tgg ctc ggc  
6384  
Asp Lys Leu Ser Lys Glu Asp Ile Asp Val Arg Leu Lys Trp Leu Gly  
115 120 125

ctc ttc cac cgc cgc aag cat cag t gtagcctct cttctcttgc  
6429  
Leu Phe His Arg Arg Lys His Gln  
130 135

tcctctgatac aacacatttt cttgctttcg ttcgggttatt tgcgcgccg aggaagttaa  
6489

ttcgccaaga tattctgcag ttttttttct cgatgcacat tcagcaacct aattaagact  
6549

gattaagttg ctgtgatttt tatagcttaa ttacgggtctc gtgggtaatg actatttata  
6609

ttgagtaaac atgggttacct ttgatccaat cacttcacct ccatgtgccca tatatagcca  
6669

caggctctac caagtaacac tagtaatatg cctgtgatac gccacggtgg cataataaat  
6729

cattaaattt tattataatc aaattaagga tcctaaaatt ggtccaattg ggtgttaatt  
6789

cgatgcaggt catataaaaa tatatttttag gcaagggtgca attcaagagc atcaaccatt  
6849

atatccaatc actttaatat atatttgaag ataacatatg tcggaaaaaa aatgatggag  
6909

agctattttca ttaacttgtg agcataaaca gatcaccaga tgatgccacc ataagtcccg  
6969

ccacagtaag tgatgcagct catcttgccc taggcggttcg gtctaaccag tagatagaaa  
7029

gagtacaaca tagatcgaat gaaaaaaaaa atctccagaa gaaagctcaa ccacattgag  
7089

taaattagag caacaatcaa atcgagtcag catatcgta tgtagcaga accaatcacc  
7149

acaatttggt tctcctcttt atctaagtgt ttgcccaggt taaaagcata tatcactatg  
7209

ttccaagcaa acatcggaac tggacatgtc aaaaataaat gatcaattgt ttctttgagt  
7269

acaaaattga caatggacac tatgttcctt tgtagaatt ctatttgtca gggtaggatg  
7329

tagaaaaact taacttttag aggaagctta aatatccggc ataaacttgc tttttcagcg  
7389

ctctataaaa taattcaaca gtgaattgtc catcttttct aagtgtcca aaagacacta  
7449

agttgaaaaa ccaggtgaac caacagattg atccacaaaa tcttattatt agattattca  
7509

cttaaaagcc tgtctttatt tcaaacatat aaaaacagaa gttattaatc agggaagcgc  
7569

ttatggcagc ctgagcgaac cagtgatagc aagtggtgaa aacagtaaat aggatacata  
7629

aaaattatac aaggtttcta ctgtttatca aaaaaaata ttgaaaaca gtaaataagg  
7689

tacataatcg acttccaact tgtccttatc ataacatcca gaatcacac aagaattgca  
7749

acgaatacat agtcgacttg agctaagaag tcacaagacc tgtcaaagta agctgcctt  
7809

gatcttgaag tgaaaggcat attttattgt ctcccttggc aaacagatat cactgtcttc  
7869

agcagttcag ttagataatc caagatttct cacggagaag agcatatcac tcgcatcagt  
7929

gttgtgcct ccaaatactg agataaactg aattttgttc tctttgaagc atctgcaggc  
7989

attaacaatt ataatacttt acaaagtttc attgggtcta aactattggt tgcacatcat  
8049

atatatgccc agaacttttt agcatgatac aagggtcctg ttcataactc atgcctaaat  
8109

ctgacaaaatt tgtcaaacga caatataagt cgaattataa tgcgttttag aattgacgcc  
8169

aaaacttttg ctagcgtaag taactcttcc acctcccagc atgcatacaa ccaacaagct  
8229

aaacttttgt tcaaaaaaat gtacatttat ttccttgaac acagcctttg tagaatatga  
8289

ttaaaaaactc atggatgaat gaaataatgt aaaagaatgg tcaaatgat gaatagtaca  
8349

agaagcaact gtgaacattt cacctttacc tgactgttcg caagaaggcc acgtggcaga  
8409

aaagccagaa atgcaagaag cttccctaata tgatacacca tcaagaaatc aatggactca  
8469

acaccagcgt ctgcccagac aaaatgaatg caggcaccta aaatatagaa ccattgactt  
8529

ttcaacactg aattatataa cctgaatatc ttgttttttt aacacatctg acaaatcag  
8589

tgcattctgt tccatataga tgtatgcata gctcccatat gttagttgat cgatgagcat  
8649

gcaaaactata cacaccttac gttactccct ctgtcaaaaa aaatataagc ttgtctagat  
8709

acatagctac aaatgcttat atttttggat tctcttaaag ctgtagaaac ttttatcgcc  
8769

ccgccatggc aagtcgagat gccatcccca atgaaagccc ccacacaggt ttcatgccct  
8829

gctgcacaat attgagcaac caaaaatata ataatatattg tgtcagaatt tgaatcaacc  
8889

ttacagatac tgggtggcca gaaaatctag tccaagtaat atcctgaaaa atagcaactg  
8949

gcaaatacta aaggcagtga agagtctcct ttagatcaga tgataaaaaa aaatcatatg  
9009

ttcaatagca ataactactc acattttttt tgctgttttag aatttagata attagtagtt  
9069

aaacttctat agcttgcgta gctaagatca atgggtgatta ttagttgaaa aaataatcaa  
9129

atcatcaaac tgaggagact tatacctgcc ataagttctg aaatttcaat gatcctagtc  
9189

aatatttact gtatatatag aattaggtcc aaaagatgat acttacaatt aaggatggtg  
9249

tattgatcgg ttcataactc aagcttctat ttatcattaa tcaaaagctg gatcattcat  
9309

gcatatacct ttgccgcact caacgtagca gctcggagtc ttctttgttc agaagcgagg  
9369

aaggagtcaa caaataagta ctgcaatgtt aaacaaaccg acatatcaaa tcccaaatta  
9429

agaatgcatg atttattaat acaggaaata tatgatcaag tccccaaaaag tgagtcattg  
9489

tatgtacact cagtcacaa tttcaataag aatattaact tgctcattgg tatatggatt  
9549

tgattatgac ataatttgac aatacattta cagaataaac ttgcagtgtg gtgagcatat  
9609

gttactaaca tgtaaggacc ttgttttgct ctgttcaata ctcattgtga tcttgatctg  
9669

tgtccacata tacctaaatg aaatgaaatc aaagaatgag gtttgtagga gtggagttgg  
9729

tgaattatag ggtagataat gtcggcaca cgttttgata agtagtacga gtactttatt  
9789

tggcgccacc ggcgcagcat cagatgtgtg gcctttgcac tgattgaatc caaaagaaaa  
9849

aaaaagtcgt tttgggtcca cacaattcta cttcatctgc aggatgtaca gaagggtaca  
9909

tatctattct gttctatgct ctgtttacat ttatatttat agtactaggt tgaaagggct  
9969

cacttggtgg ctgtcattgg ttggctggtg cggatatatta ctaatagggt ttttaattggc  
10029

atatatgttc ttaaaataaa ccagaaaagc aaaagatcaa ctatcttagc cacaccaatg  
10089

aaatggaata tactgaactg tcacggctaa aattctcttc agtcacctgg cccaactgga  
10149

gccgtgggct cgctgtcttt tctaaacatg tactagtatt ttggggggccc acagtgaatt  
10209

tggcccaaaa tgctgacagc cgctctacgg ctctacgctg tgcag at ggg cgg ttc  
10265

Tyr Gly Arg Phe  
140

atg atg cgg ctg aag ctg cca aac ggt gtg acg acg agc gag cag acg  
10313

Met Met Arg Leu Lys Leu Pro Asn Gly Val Thr Thr Ser Glu Gln Thr  
145 150 155

agg tac ctg gcg agc gtg atc gag gcg tac ggc aag gag ggc tgc gcc  
10361

Arg Tyr Leu Ala Ser Val Ile Glu Ala Tyr Gly Lys Glu Gly Cys Ala  
160 165 170

gac gtg aca acc cgc cag aac tgg cag atc cgc ggc gtc acg ctc ccc  
10409

Asp Val Thr Thr Arg Gln Asn Trp Gln Ile Arg Gly Val Thr Leu Pro  
175 180 185

gac gtg ccg gcc atc ctc gac ggg ctc aac gcc gtc ggc ctc acc agc  
10457

Asp Val Pro Ala Ile Leu Asp Gly Leu Asn Ala Val Gly Leu Thr Ser  
 190 195 200

ctc cag agc ggc atg gac aac gtc cgc aac ccc gtc ggc aac ccg ctc  
 10505

Leu Gln Ser Gly Met Asp Asn Val Arg Asn Pro Val Gly Asn Pro Leu  
 205 210 215 220

gcc ggc atc gac ccc gac gag atc gtc gac acg cga tcc tac acc aac  
 10553

Ala Gly Ile Asp Pro Asp Glu Ile Val Asp Thr Arg Ser Tyr Thr Asn  
 225 230 235

ctc ctc tcc tcc tac atc acc agc aac ttc cag ggc aac ccc acc atc  
 10601

Leu Leu Ser Ser Tyr Ile Thr Ser Asn Phe Gln Gly Asn Pro Thr Ile  
 240 245 250

acc aac ct gtgagtgatc gaatcaaatt gatcatgctc tgtgctgtgc  
 10649

Thr Asn Leu

tgtttcgtgt cgtctctgac gacatgtttg ttgaatttgt tgttgctgcg tgctgttggc  
 10709

ag g ccg agg aag tgg aac gtg tgc gtg atc ggg tcg cac gat ctg tac  
 10757

Pro Arg Lys Trp Asn Val Cys Val Ile Gly Ser His Asp Leu Tyr  
 260 265 270

gag cac cca cac atc aac gac ctc gcg tac atg ccg gcg gtg aag ggc  
 10805

Glu His Pro His Ile Asn Asp Leu Ala Tyr Met Pro Ala Val Lys Gly  
 275 280 285

ggc aag ttc ggg ttc aac ctc ctc gtc ggc ggg ttc ata agc ccc aag  
 10853

Gly Lys Phe Gly Phe Asn Leu Leu Val Gly Gly Phe Ile Ser Pro Lys  
 290 295 300

agg tgg gag gag gcg ctg ccg ctc gac gcc tgg gtc ccc ggc gac gac  
 10901

Arg Trp Glu Glu Ala Leu Pro Leu Asp Ala Trp Val Pro Gly Asp Asp  
 305 310 315

atc atc ccg gtg tgc aag gcc gtt ctc gag gcg tac cgc gac ctc ggc  
 10949

Ile Ile Pro Val Cys Lys Ala Val Leu Glu Ala Tyr Arg Asp Leu Gly  
 320 325 330

acc agg ggc aac cgc cag aag acc cgc atg atg tgg ctc atc gac gaa  
 10997

Thr Arg Gly Asn Arg Gln Lys Thr Arg Met Met Trp Leu Ile Asp Glu  
 335 340 345 350

ctt gtgaaccatt tttttctcca ttcattccacg ccattgactg aattacgtat  
 11050

Leu

gtcccaatgt tcttatcagt taattgcggt gttggcattg cag gga atg gag gct  
11105

Gly Met Glu Ala  
355

ttt cgg tcg gag gtg gag aag agg atg ccg aac ggc gtg ctg gag cgc  
11153

Phe Arg Ser Glu Val Glu Lys Arg Met Pro Asn Gly Val Leu Glu Arg  
360 365 370

gcg gcg ccg gag gac ctc atc gac aag aaa tgg cag agg agg gac tac  
11201

Ala Ala Pro Glu Asp Leu Ile Asp Lys Lys Trp Gln Arg Arg Asp Tyr  
375 380 385

ctc ggc gtg cac ccg cag aag cag gaa ggg atg tcc tac gtc ggc ctg  
11249

Leu Gly Val His Pro Gln Lys Gln Glu Gly Met Ser Tyr Val Gly Leu  
390 395 400

cac gtg ccc gtc ggc cgg gtg cag gcg gcg gac atg ttc gag ctc gca  
11297

His Val Pro Val Gly Arg Val Gln Ala Ala Asp Met Phe Glu Leu Ala  
405 410 415

cgc ctc gcc gac gag tac ggc tcc ggc gag ctc cgc ctc acc gtg gag  
11345

Arg Leu Ala Asp Glu Tyr Gly Ser Gly Glu Leu Arg Leu Thr Val Glu  
420 425 430 435

cag aac atc gtg atc ccg aac gtc aag aac gag aag gtg gag gcg ctg  
11393

Gln Asn Ile Val Ile Pro Asn Val Lys Asn Glu Lys Val Glu Ala Leu  
440 445 450

ctc tcc gag ccg ctg ctt cag aag ttc tcc ccg cag ccg tcg ctg ctg  
11441

Leu Ser Glu Pro Leu Leu Gln Lys Phe Ser Pro Gln Pro Ser Leu Leu  
455 460 465

ctc aag ggc ctc gtc gcg tgc acc ggc aac cag ttc tgc ggc cag gcc  
11489

Leu Lys Gly Leu Val Ala Cys Thr Gly Asn Gln Phe Cys Gly Gln Ala  
470 475 480

atc atc gag acg aag cag ccg gcg ctg ctg gtg acg tcg cag gtg gag  
11537

Ile Ile Glu Thr Lys Gln Arg Ala Leu Leu Val Thr Ser Gln Val Glu  
485 490 495

aag ctc gtg tcg gtg ccc ccg gcg gtg ccg atg cac tgg acc ggc tgc  
11585

Lys Leu Val Ser Val Pro Arg Ala Val Arg Met His Trp Thr Gly Cys  
500 505 510 515

ccc aac agc tgc ggc cag gtg cag gtc gcc gac atc ggc ttc atg ggc  
11633

Pro Asn Ser Cys Gly Gln Val Gln Val Ala Asp Ile Gly Phe Met Gly  
520 525 530

tgc ctc acc aag gac agc gcc ggc aag atc gtt gag gcg gcc gac atc  
11681

Cys Leu Thr Lys Asp Ser Ala Gly Lys Ile Val Glu Ala Ala Asp Ile  
535 540 545

ttc gtc ggc ggc cgc gtc ggc agc gac tcg cac ctc gcc ggc gcg tac  
11729

Phe Val Gly Gly Arg Val Gly Ser Asp Ser His Leu Ala Gly Ala Tyr  
550 555 560

aag aag tcc gtg ccg tgc gac gag ctg gcg ccg atc gtc gcc gac atc  
11777

Lys Lys Ser Val Pro Cys Asp Glu Leu Ala Pro Ile Val Ala Asp Ile  
565 570 575

ctg gtc gag cgg ttc ggg gcc gtg cgg agg gag agg gag gag gac gag  
11825

Leu Val Glu Arg Phe Gly Ala Val Arg Arg Glu Arg Glu Glu Asp Glu  
580 585 590 595

gag tag gaacacagac tgggggtgttt tgcttgctcc ggtgatctct cgccgtcctt  
11881  
Glu

gtaaagtaga cgacaatatg ccttcgcca tggcacgctt gtactgtcac gttttggttt  
11941

gatcttgtag cccaaaagtt gtgttcattc tcgttacagt cttacagagg atgattgatt  
12001

gataaataaa gaagaaacag attctgcaac tgttcacgc tgttcctaaa tctgatttag  
12061

cgaaagtatc ttgcctgacc tgtcccaatc gcagtgctaa aaccatataa tcttgcaagc  
12121

aaatgaaatt gaaagagttc aatgcaacca ctaacagtct aacaacatga taaggcct  
12179

<210> 5  
<211> 2508  
<212> DNA  
<213> Oryza sativa

<220>  
<221> CDS  
<222> (519)..(2309)  
<223>

<400> 5  
tatcgaacct tatctccttc tctctcgctg ctttctgcgt ctccccgtct ctcttcgcc  
60

aacagccgag aagaggcaga gagagcgccg cccccgtcc ctctctctcc ctctcgctct  
120

cgcccccatc cctctcgctt ttcccttgcc ggcagcagag gaggcggcag cgacggcttc  
180



agctgctccc acgggccgga tcgggcagtg gcggtggcgt cggcggttc cgctggcgaa  
240

tccggcgggg ggatacaaat cagtgttccg ataggtaaaa ccctgctctc agcatctgcc  
300

cttttgaatt cgccaagagc cagcatctgc ctttttgaat tcgccaaggg ccagcatctg  
360

cccatttgat tttgaattcg ccaagagcca gcaacagcgc ccccgcgccc cctccctcct  
420

ccgcaataaa cagccacacg cgccgcccc atgtccaccc tcatcgccac agcgcaccac  
480

caccaccacc accaccacca ccaccaccgt ctccagcc atg gcc tcc tcc gcc tcc  
536

Met Ala Ser Ser Ala Ser  
1 5

ctg cag cgc ttc ctc ccc ccg tac ccc cac gcg gca gca tcc cgc tgc  
584

Leu Gln Arg Phe Leu Pro Pro Tyr Pro His Ala Ala Ala Ser Arg Cys  
10 15 20

cgc cct ccc ggc gtc cgc gcc cgc ccc gtg cag tcg tcg acg gtg tcc  
632

Arg Pro Pro Gly Val Arg Ala Arg Pro Val Gln Ser Ser Thr Val Ser  
25 30 35

gca ccg tcc tcc tcg act ccg gcg gcg gac gag gcc gtg tcg gcg gag  
680

Ala Pro Ser Ser Ser Thr Pro Ala Ala Asp Glu Ala Val Ser Ala Glu  
40 45 50

cgg ctg gag ccg cgg gtg gag cag cgg gag ggc cgg tac tgg gtg ctc  
728

Arg Leu Glu Pro Arg Val Glu Gln Arg Glu Gly Arg Tyr Trp Val Leu  
55 60 65 70

aag gag aag tac ccg acg ggg ctg aac ccg cag gag aag gtg aag ctg  
776

Lys Glu Lys Tyr Arg Thr Gly Leu Asn Pro Gln Glu Lys Val Lys Leu  
75 80 85

ggg aag gag ccc atg tca ttg ttc atg gag ggc ggc atc aag gag ctc  
824

Gly Lys Glu Pro Met Ser Leu Phe Met Glu Gly Gly Ile Lys Glu Leu  
90 95 100

gcc aag atg ccc atg gag gag atc gag gcc gac aag ctc tcc aag gag  
872

Ala Lys Met Pro Met Glu Glu Ile Glu Ala Asp Lys Leu Ser Lys Glu  
105 110 115

gac atc gac gtg cgg ctc aag tgg ctc ggc ctc ttc cac cgc cgc aag  
920

Asp Ile Asp Val Arg Leu Lys Trp Leu Gly Leu Phe His Arg Arg Lys  
120 125 130

cat cag tat ggg cgg ttc atg atg cgg ctg aag ctg cca aac ggt gtg  
968  
His Gln Tyr Gly Arg Phe Met Met Arg Leu Lys Leu Pro Asn Gly Val  
135 140 145 150

acg acg agc gag cag acg agg tac ctg gcg agc gtg atc gag gcg tac  
1016  
Thr Thr Ser Glu Gln Thr Arg Tyr Leu Ala Ser Val Ile Glu Ala Tyr  
155 160 165

ggc aag gag ggc tgc gcc gac gtg aca acc cgc cag aac tgg cag atc  
1064  
Gly Lys Glu Gly Cys Ala Asp Val Thr Thr Arg Gln Asn Trp Gln Ile  
170 175 180

cgc ggc gtc acg ctc ccc gac gtg ccg gcc atc ctc gac ggg ctc aac  
1112  
Arg Gly Val Thr Leu Pro Asp Val Pro Ala Ile Leu Asp Gly Leu Asn  
185 190 195

gcc gtc ggc ctc acc agc ctc cag agc ggc atg gac aac gtc cgc aac  
1160  
Ala Val Gly Leu Thr Ser Leu Gln Ser Gly Met Asp Asn Val Arg Asn  
200 205 210

ccc gtc ggc aac ccg ctc gcc ggc atc gac ccc gac gag atc gtc gac  
1208  
Pro Val Gly Asn Pro Leu Ala Gly Ile Asp Pro Asp Glu Ile Val Asp  
215 220 225 230

acg cga tcc tac acc aac ctc ctc tcc tcc tac atc acc agc aac ttc  
1256  
Thr Arg Ser Tyr Thr Asn Leu Leu Ser Ser Tyr Ile Thr Ser Asn Phe  
235 240 245

cag ggc aac ccc acc atc acc aac ctg ccg agg aag tgg aac gtg tgc  
1304  
Gln Gly Asn Pro Thr Ile Thr Asn Leu Pro Arg Lys Trp Asn Val Cys  
250 255 260

gtg atc ggg tcg cac gat ctg tac gag cac cca cac atc aac gac ctc  
1352  
Val Ile Gly Ser His Asp Leu Tyr Glu His Pro His Ile Asn Asp Leu  
265 270 275

gcg tac atg ccg gcg gtg aag ggc ggc aag ttc ggg ttc aac ctc ctc  
1400  
Ala Tyr Met Pro Ala Val Lys Gly Gly Lys Phe Gly Phe Asn Leu Leu  
280 285 290

gtc ggc ggg ttc ata agc ccc aag agg tgg gag gag gcg ctg ccg ctc  
1448  
Val Gly Gly Phe Ile Ser Pro Lys Arg Trp Glu Glu Ala Leu Pro Leu  
295 300 305 310

gac gcc tgg gtc ccc ggc gac gac atc atc ccg gtg tgc aag gcc gtt  
1496  
Asp Ala Trp Val Pro Gly Asp Asp Ile Ile Pro Val Cys Lys Ala Val  
315 320 325

ctc gag gcg tac cgc gac ctc ggc acc agg ggc aac cgc cag aag acc  
1544  
Leu Glu Ala Tyr Arg Asp Leu Gly Thr Arg Gly Asn Arg Gln Lys Thr  
330 335 340

cgc atg atg tgg ctc atc gac gaa ctt gga atg gag gct ttt cgg tcg  
1592  
Arg Met Met Trp Leu Ile Asp Glu Leu Gly Met Glu Ala Phe Arg Ser  
345 350 355

gag gtg gag aag agg atg ccg aac ggc gtg ctg gag cgc gcg gcg ccg  
1640  
Glu Val Glu Lys Arg Met Pro Asn Gly Val Leu Glu Arg Ala Ala Pro  
360 365 370

gag gac ctc atc gac aag aaa tgg cag agg agg gac tac ctc ggc gtg  
1688  
Glu Asp Leu Ile Asp Lys Lys Trp Gln Arg Arg Asp Tyr Leu Gly Val  
375 380 385 390

cac ccg cag aag cag gaa ggg atg tcc tac gtc ggc ctg cac gtg ccc  
1736  
His Pro Gln Lys Gln Glu Gly Met Ser Tyr Val Gly Leu His Val Pro  
395 400 405

gtc ggc cgg gtg cag gcg gcg gac atg ttc gag ctc gca cgc ctc gcc  
1784  
Val Gly Arg Val Gln Ala Ala Asp Met Phe Glu Leu Ala Arg Leu Ala  
410 415 420

gac gag tac ggc tcc ggc gag ctc cgc ctc acc gtg gag cag aac atc  
1832  
Asp Glu Tyr Gly Ser Gly Glu Leu Arg Leu Thr Val Glu Gln Asn Ile  
425 430 435

gtg atc ccg aac gtc aag aac gag aag gtg gag gcg ctg ctc tcc gag  
1880  
Val Ile Pro Asn Val Lys Asn Glu Lys Val Glu Ala Leu Leu Ser Glu  
440 445 450

ccg ctg ctt cag aag ttc tcc ccg cag ccg tcg ctg ctg ctc aag ggc  
1928  
Pro Leu Leu Gln Lys Phe Ser Pro Gln Pro Ser Leu Leu Leu Lys Gly  
455 460 465 470

ctc gtc gcg tgc acc ggc aac cag ttc tgc ggc cag gcc atc atc gag  
1976  
Leu Val Ala Cys Thr Gly Asn Gln Phe Cys Gly Gln Ala Ile Ile Glu  
475 480 485

acg aag cag cgg gcg ctg ctg gtg acg tcg cag gtg gag aag ctc gtg  
2024  
Thr Lys Gln Arg Ala Leu Leu Val Thr Ser Gln Val Glu Lys Leu Val  
490 495 500

tcg gtg ccc cgg gcg gtg cgg atg cac tgg acc ggc tgc ccc aac agc  
2072  
Ser Val Pro Arg Ala Val Arg Met His Trp Thr Gly Cys Pro Asn Ser  
505 510 515

tgc ggc cag gtg cag gtc gcc gac atc ggc ttc atg ggc tgc ctc acc  
 2120  
 Cys Gly Gln Val Gln Val Ala Asp Ile Gly Phe Met Gly Cys Leu Thr  
       520                              525                              530

aag gac agc gcc ggc aag atc gtt gag gcg gcc gac atc ttc gtc ggc  
 2168  
 Lys Asp Ser Ala Gly Lys Ile Val Glu Ala Ala Asp Ile Phe Val Gly  
 535                              540                              545                              550

ggc cgc gtc ggc agc gac tcg cac ctc gcc ggc gcg tac aag aag tcc  
 2216  
 Gly Arg Val Gly Ser Asp Ser His Leu Ala Gly Ala Tyr Lys Lys Ser  
                               555                              560                              565

gtg ccg tgc gac gag ctg gcg ccg atc gtc gcc gac atc ctg gtc gag  
 2264  
 Val Pro Cys Asp Glu Leu Ala Pro Ile Val Ala Asp Ile Leu Val Glu  
                               570                              575                              580

cgg ttc ggg gcc gtg cgg agg gag agg gag gag gac gag gag tag  
 2309  
 Arg Phe Gly Ala Val Arg Arg Glu Arg Glu Glu Asp Glu Glu  
                               585                              590                              595

gaacacagac tggggtgttt tgcttgcctc ggtgatctct cgccgtcctt gtaaagtaga  
 2369

cgacaatatg ccttcgccc tggcacgctt gtactgtcac gttttgggtt gatctttag  
 2429

cccaaaagtt gtgttcattc tcgttacagt cttacagagg atgattgatt gataaataaa  
 2489

gaagaaacag attctgcaa  
 2508

<210> 6  
 <211> 596  
 <212> PRT  
 <213> Oryza sativa

<400> 6  
 Met Ala Ser Ser Ala Ser Leu Gln Arg Phe Leu Pro Pro Tyr Pro His  
 1                              5                              10                              15  
 Ala Ala Ala Ser Arg Cys Arg Pro Pro Gly Val Arg Ala Arg Pro Val  
                               20                              25                              30  
 Gln Ser Ser Thr Val Ser Ala Pro Ser Ser Ser Thr Pro Ala Ala Asp  
                               35                              40                              45  
 Glu Ala Val Ser Ala Glu Arg Leu Glu Pro Arg Val Glu Gln Arg Glu  
                               50                              55                              60  
 Gly Arg Tyr Trp Val Leu Lys Glu Lys Tyr Arg Thr Gly Leu Asn Pro  
 65                              70                              75                              80  
 Gln Glu Lys Val Lys Leu Gly Lys Glu Pro Met Ser Leu Phe Met Glu  
                               85                              90                              95

Gly	Gly	Ile	Lys	Glu	Leu	Ala	Lys	Met	Pro	Met	Glu	Glu	Ile	Glu	Ala	100	105	110
Asp	Lys	Leu	Ser	Lys	Glu	Asp	Ile	Asp	Val	Arg	Leu	Lys	Trp	Leu	Gly	115	120	125
Leu	Phe	His	Arg	Arg	Lys	His	Gln	Tyr	Gly	Arg	Phe	Met	Met	Arg	Leu	130	135	140
Lys	Leu	Pro	Asn	Gly	Val	Thr	Thr	Ser	Glu	Gln	Thr	Arg	Tyr	Leu	Ala	145	150	155
Ser	Val	Ile	Glu	Ala	Tyr	Gly	Lys	Glu	Gly	Cys	Ala	Asp	Val	Thr	Thr	165	170	175
Arg	Gln	Asn	Trp	Gln	Ile	Arg	Gly	Val	Thr	Leu	Pro	Asp	Val	Pro	Ala	180	185	190
Ile	Leu	Asp	Gly	Leu	Asn	Ala	Val	Gly	Leu	Thr	Ser	Leu	Gln	Ser	Gly	195	200	205
Met	Asp	Asn	Val	Arg	Asn	Pro	Val	Gly	Asn	Pro	Leu	Ala	Gly	Ile	Asp	210	215	220
Pro	Asp	Glu	Ile	Val	Asp	Thr	Arg	Ser	Tyr	Thr	Asn	Leu	Leu	Ser	Ser	225	230	235
Tyr	Ile	Thr	Ser	Asn	Phe	Gln	Gly	Asn	Pro	Thr	Ile	Thr	Asn	Leu	Pro	245	250	255
Arg	Lys	Trp	Asn	Val	Cys	Val	Ile	Gly	Ser	His	Asp	Leu	Tyr	Glu	His	260	265	270
Pro	His	Ile	Asn	Asp	Leu	Ala	Tyr	Met	Pro	Ala	Val	Lys	Gly	Gly	Lys	275	280	285
Phe	Gly	Phe	Asn	Leu	Leu	Val	Gly	Gly	Phe	Ile	Ser	Pro	Lys	Arg	Trp	290	295	300
Glu	Glu	Ala	Leu	Pro	Leu	Asp	Ala	Trp	Val	Pro	Gly	Asp	Asp	Ile	Ile	305	310	315
Pro	Val	Cys	Lys	Ala	Val	Leu	Glu	Ala	Tyr	Arg	Asp	Leu	Gly	Thr	Arg	325	330	335
Gly	Asn	Arg	Gln	Lys	Thr	Arg	Met	Met	Trp	Leu	Ile	Asp	Glu	Leu	Gly	340	345	350
Met	Glu	Ala	Phe	Arg	Ser	Glu	Val	Glu	Lys	Arg	Met	Pro	Asn	Gly	Val	355	360	365
Leu	Glu	Arg	Ala	Ala	Pro	Glu	Asp	Leu	Ile	Asp	Lys	Lys	Trp	Gln	Arg	370	375	380
Arg	Asp	Tyr	Leu	Gly	Val	His	Pro	Gln	Lys	Gln	Glu	Gly	Met	Ser	Tyr	385	390	395
Val	Gly	Leu	His	Val	Pro	Val	Gly	Arg	Val	Gln	Ala	Ala	Asp	Met	Phe	405	410	415

Glu	Leu	Ala	Arg	Leu	Ala	Asp	Glu	Tyr	Gly	Ser	Gly	Glu	Leu	Arg	Leu	420	425	430	
Thr	Val	Glu	Gln	Asn	Ile	Val	Ile	Pro	Asn	Val	Lys	Asn	Glu	Lys	Val	435	440	445	
Glu	Ala	Leu	Leu	Ser	Glu	Pro	Leu	Leu	Gln	Lys	Phe	Ser	Pro	Gln	Pro	450	455	460	
Ser	Leu	Leu	Leu	Lys	Gly	Leu	Val	Ala	Cys	Thr	Gly	Asn	Gln	Phe	Cys	465	470	475	480
Gly	Gln	Ala	Ile	Ile	Glu	Thr	Lys	Gln	Arg	Ala	Leu	Leu	Val	Thr	Ser	485	490	495	
Gln	Val	Glu	Lys	Leu	Val	Ser	Val	Pro	Arg	Ala	Val	Arg	Met	His	Trp	500	505	510	
Thr	Gly	Cys	Pro	Asn	Ser	Cys	Gly	Gln	Val	Gln	Val	Ala	Asp	Ile	Gly	515	520	525	
Phe	Met	Gly	Cys	Leu	Thr	Lys	Asp	Ser	Ala	Gly	Lys	Ile	Val	Glu	Ala	530	535	540	
Ala	Asp	Ile	Phe	Val	Gly	Gly	Arg	Val	Gly	Ser	Asp	Ser	His	Leu	Ala	545	550	555	560
Gly	Ala	Tyr	Lys	Lys	Ser	Val	Pro	Cys	Asp	Glu	Leu	Ala	Pro	Ile	Val	565	570	575	
Ala	Asp	Ile	Leu	Val	Glu	Arg	Phe	Gly	Ala	Val	Arg	Arg	Glu	Arg	Glu	580	585	590	
Glu	Asp	Glu	Glu													595			